

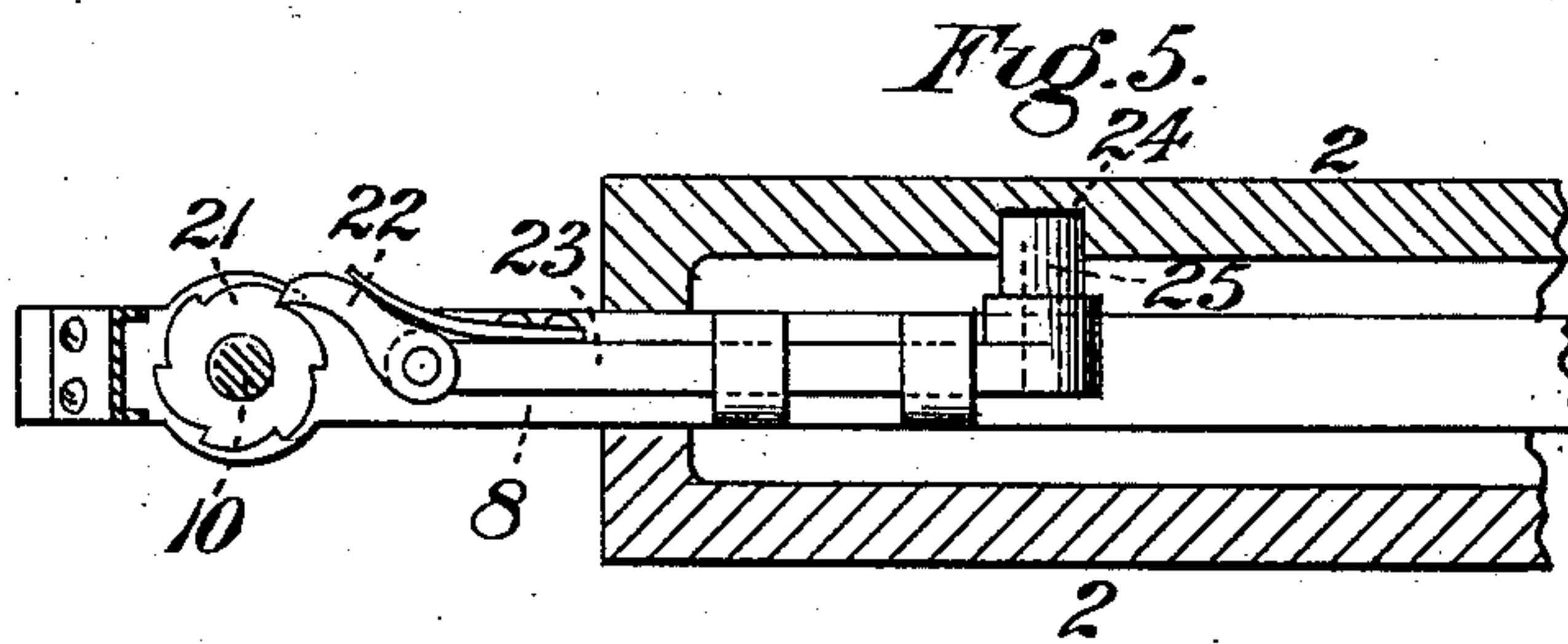
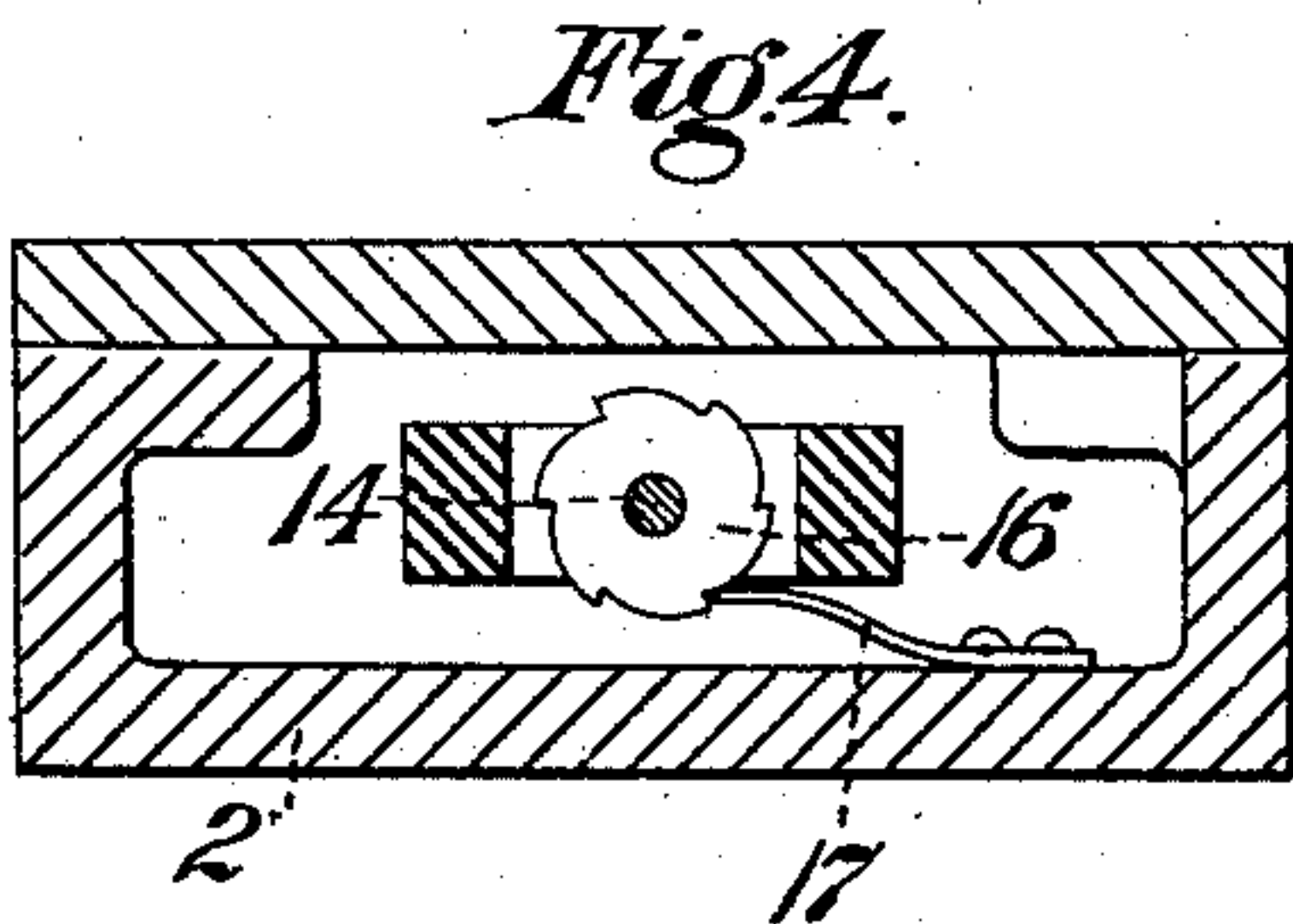
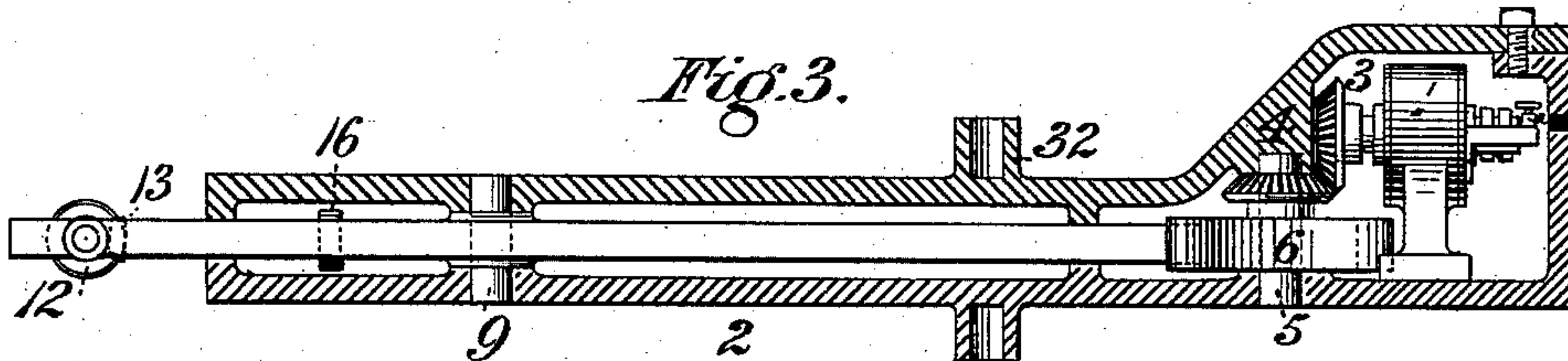
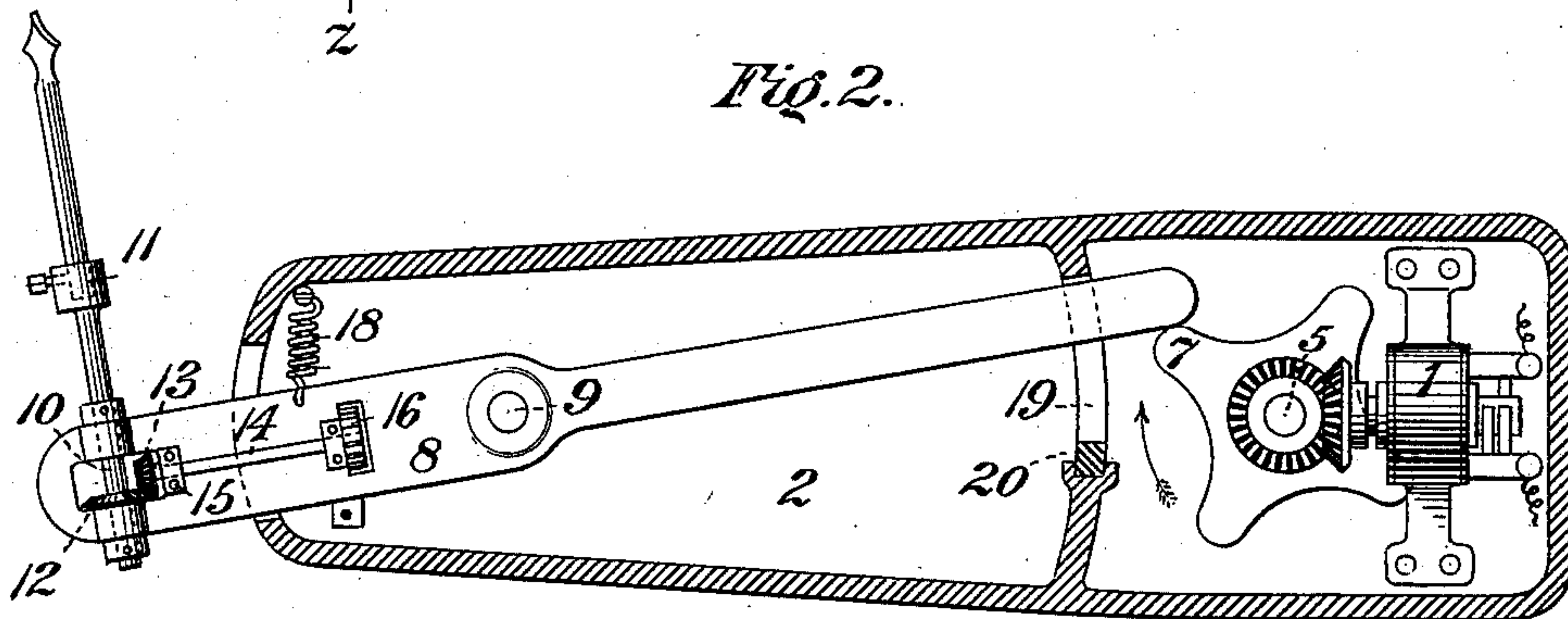
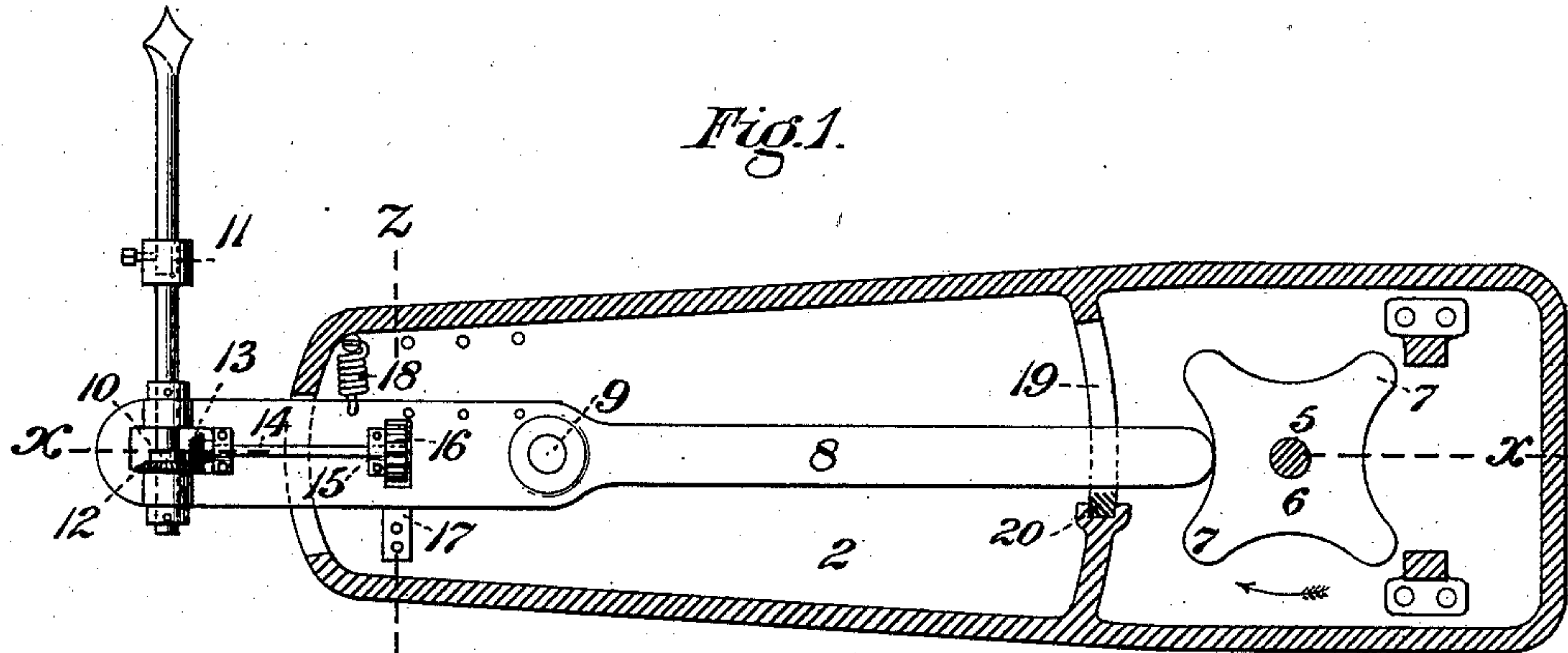
(No Model.)

3 Sheets—Sheet 1.

M. A. MICHALES.  
COAL DRILLING APPARATUS.

No. 389,524.

Patented Sept. 11, 1888.



WITNESSES:

*C. M. Clarke*  
*R. H. Whittlesy*

INVENTOR,

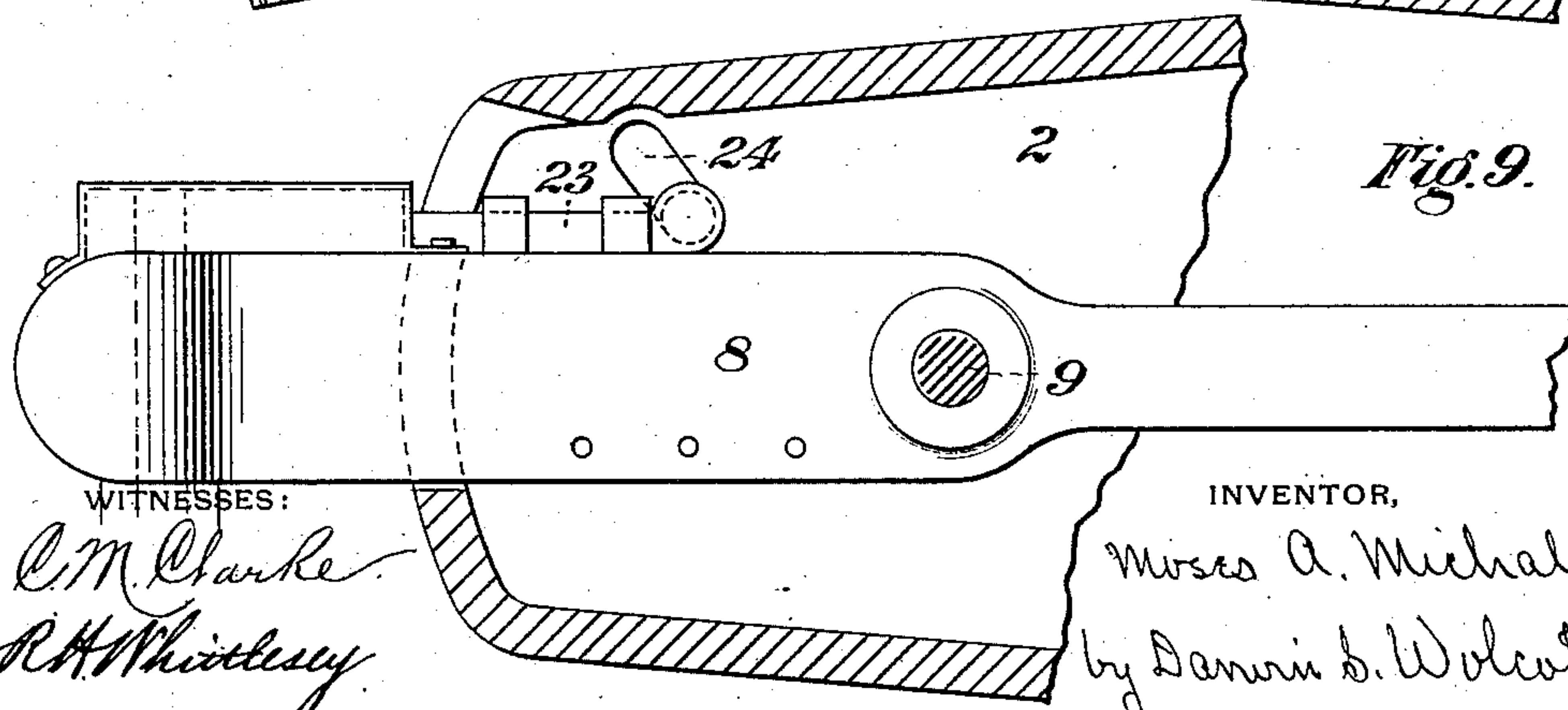
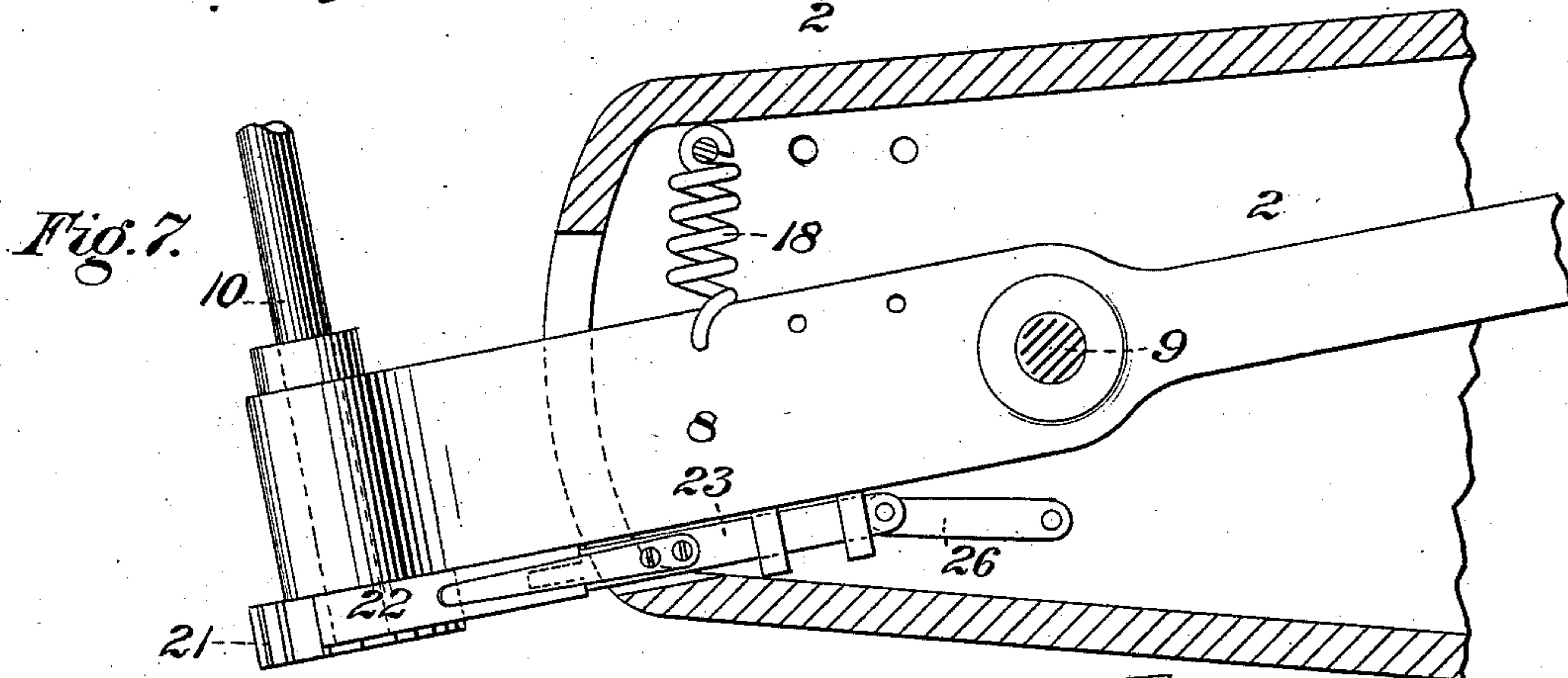
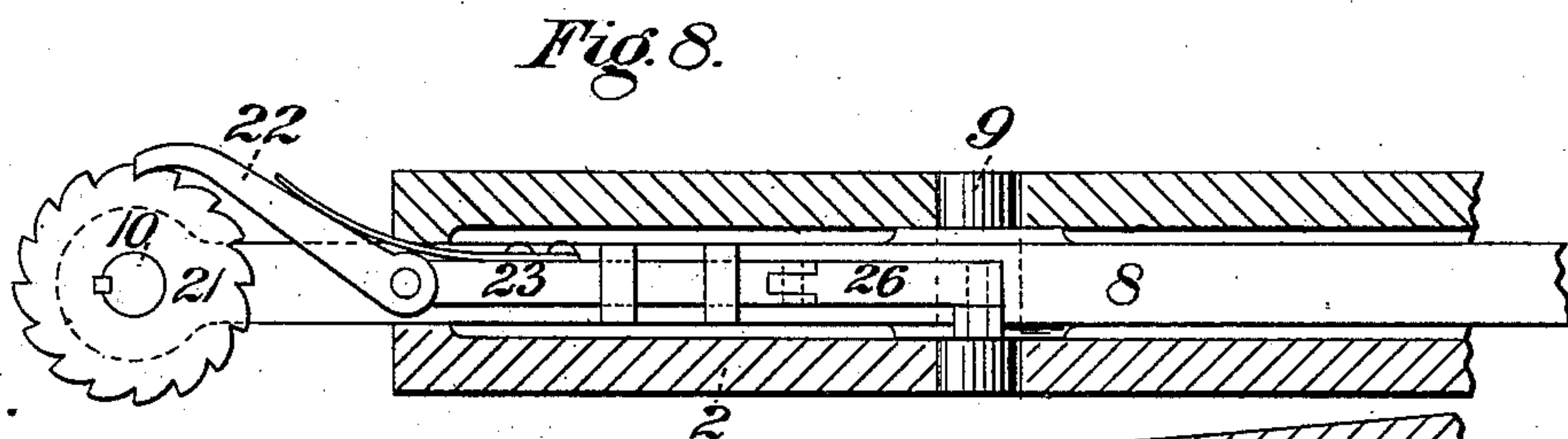
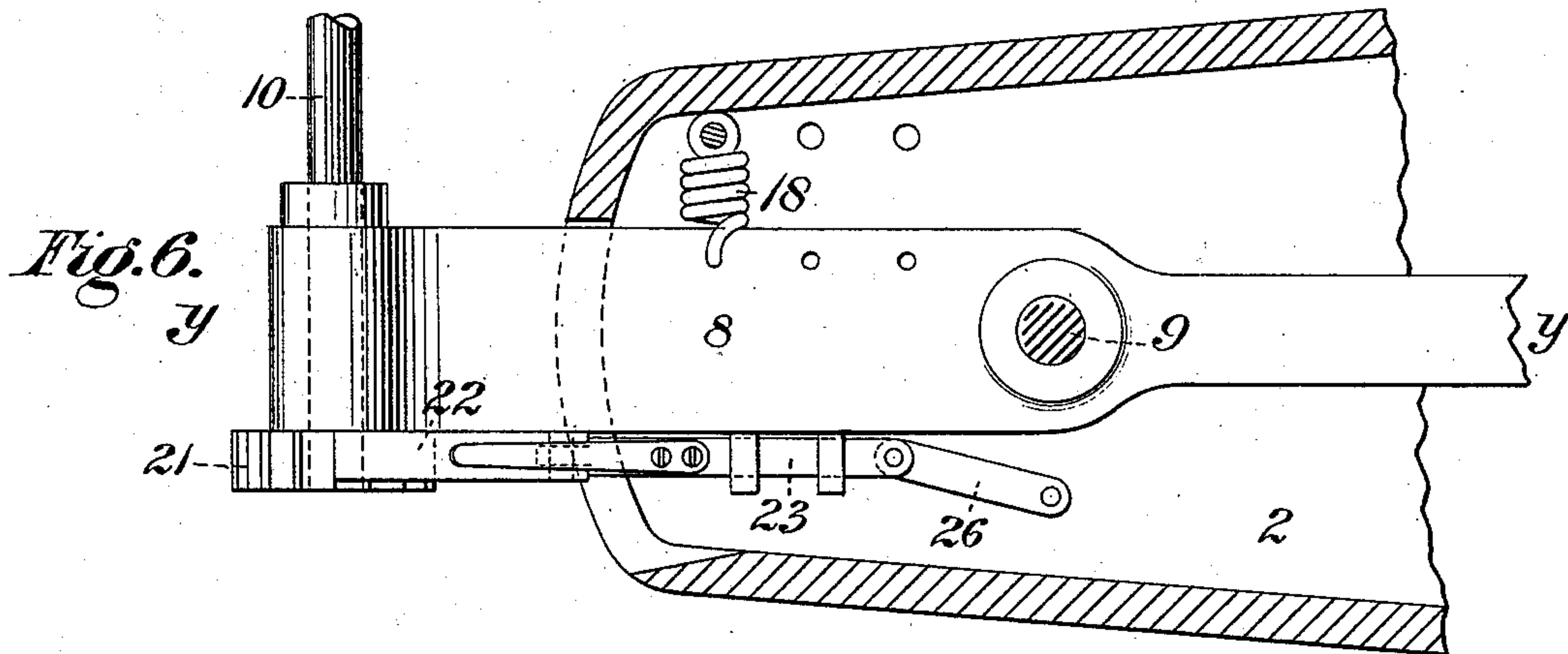
*Moses A. Michales*  
*by Danini S. Wolcott*

Att'y.

M. A. MICHALES.  
COAL DRILLING APPARATUS.

No. 389,524.

Patented Sept. 11, 1888.



WITNESSES:

*C. M. Clarke*  
*R. H. Whittlesy*

INVENTOR,

*Moses A. Michales*  
by *Darius S. Wolcott*  
Att'y.



(No Model.)

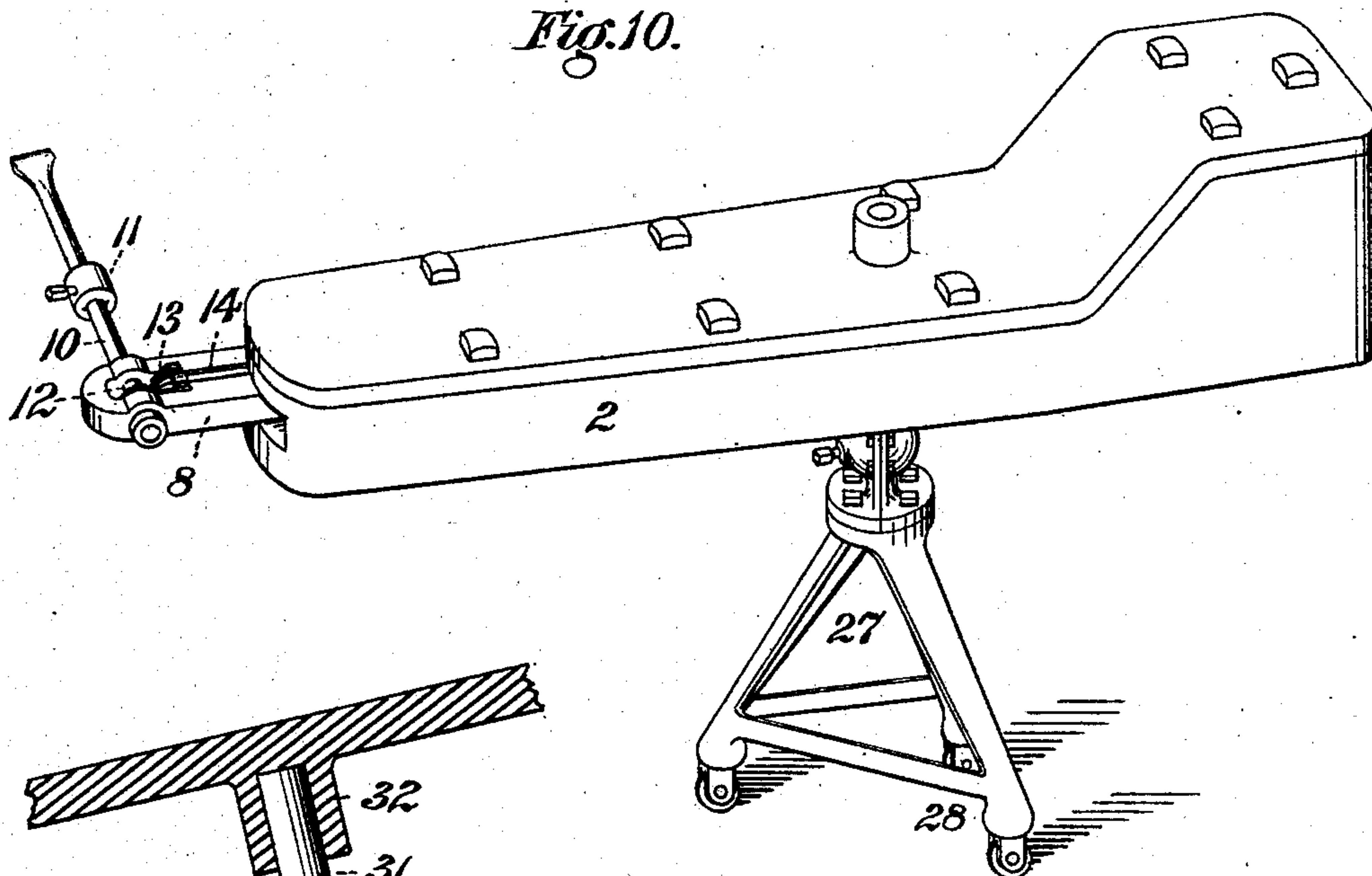
3 Sheets—Sheet 3.

M. A. MICHALES.  
COAL DRILLING APPARATUS.

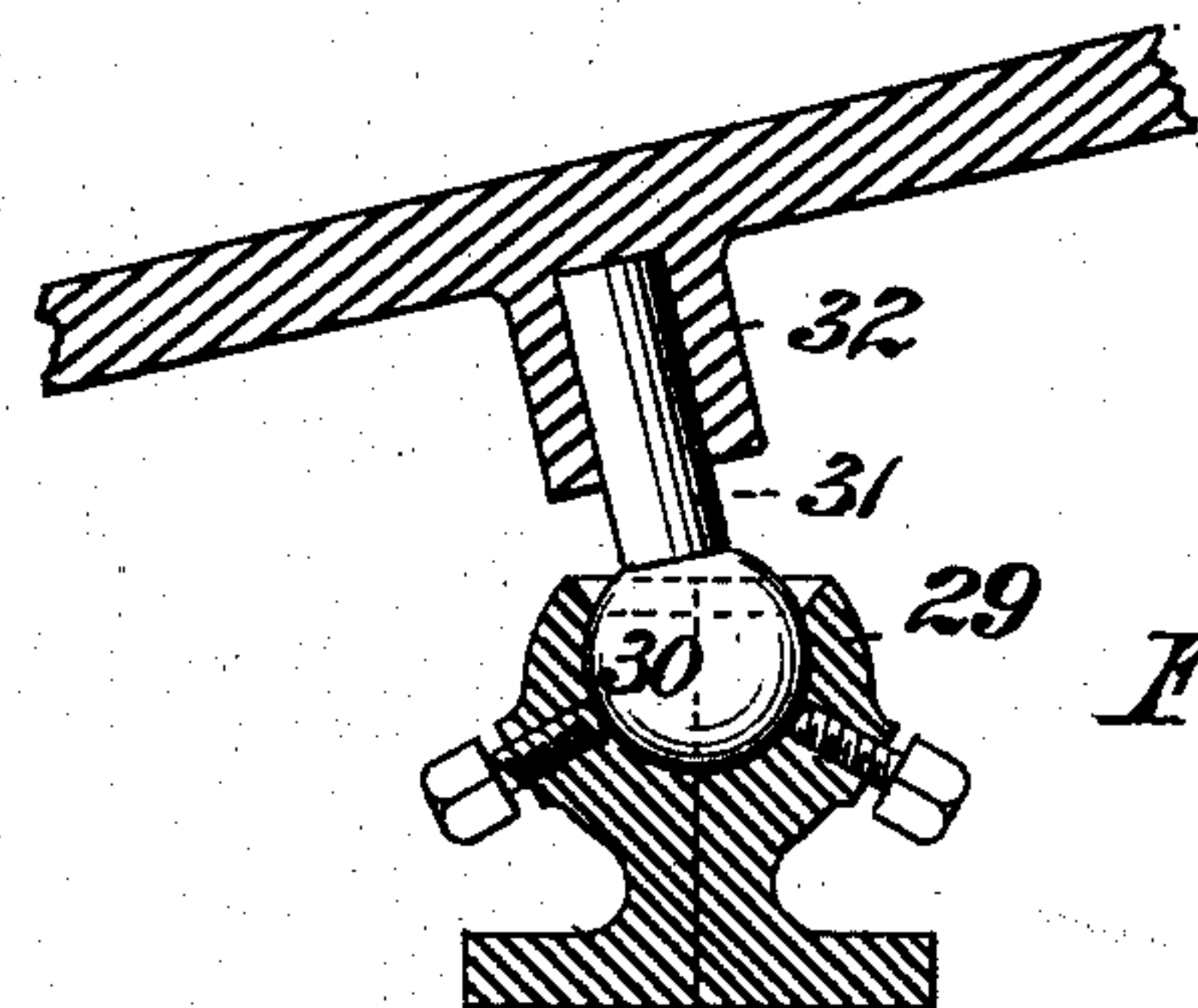
No. 389,524.

Patented Sept. 11, 1888.

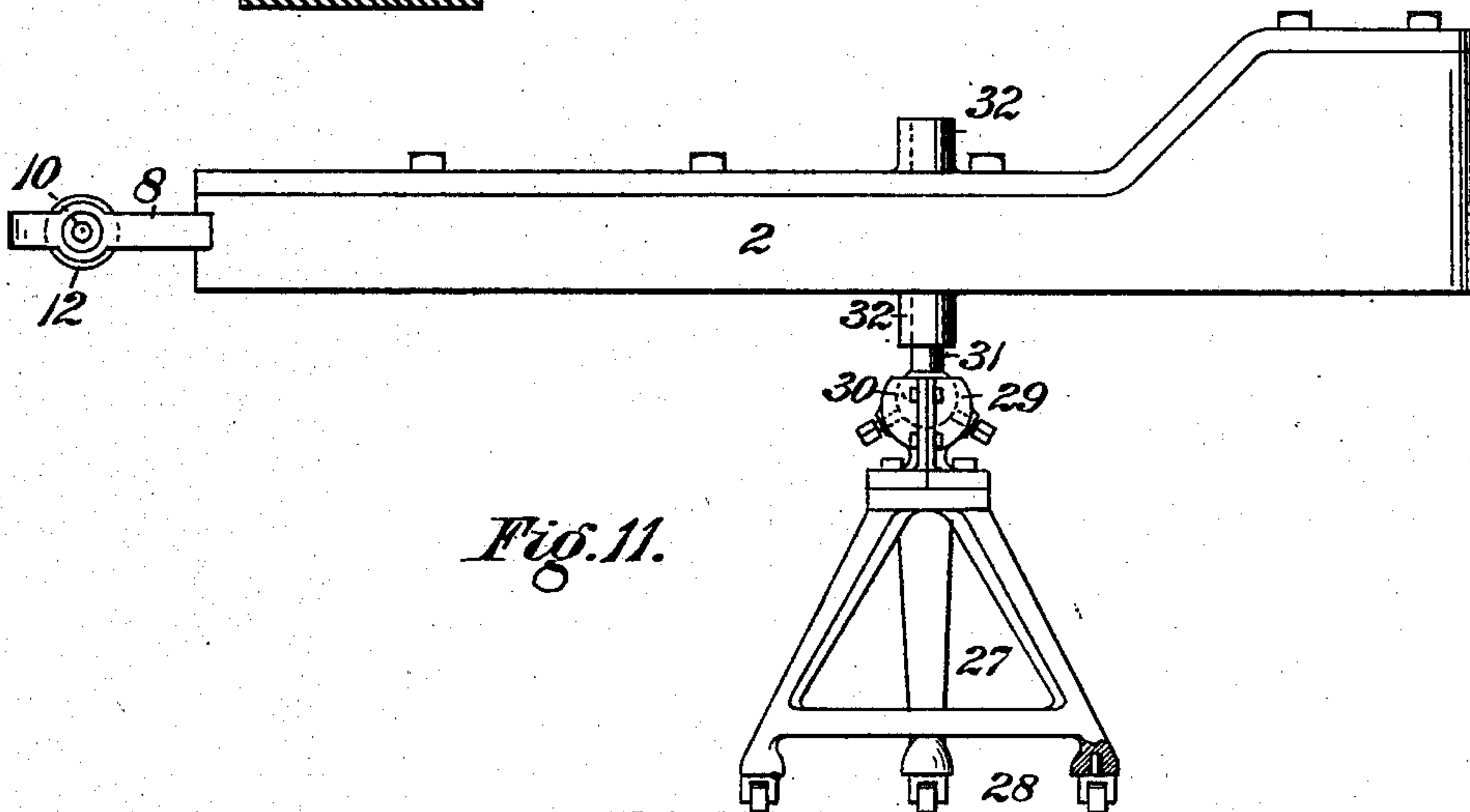
*Fig. 10.*



*Fig. 12.*



*Fig. 11.*



WITNESSES:

*E. M. Clarke.*  
*R. H. Whittey.*

INVENTOR,

*Moses A. Michales*  
*by Saml. B. Wolcott*

Att'y.



# UNITED STATES PATENT OFFICE.

MOSES A. MICHALES, OF ALLEGHENY, ASSIGNOR TO JOHN T. MOORE, OF  
PITTSBURG, PENNSYLVANIA.

## COAL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 389,524, dated September 11, 1888.

Application filed September 23, 1887. Serial No. 250,486. (No model.)

*To all whom it may concern:*

Be it known that I, MOSES A. MICHALES, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Coal-Drilling Apparatus, of which improvements the following is a specification:

The invention herein relates to certain improvements in drills or cutters for mining of coal and other minerals, and has for its object such a construction and arrangement of parts as will permit of easy transportation of the apparatus from place to place, its ready adjustment while at work, and the delivery of rapid powerful blows whose force or effectiveness is to a great extent independent of the length of movement of the cutting-tool.

In general terms the invention consists in the construction and combination of parts substantially as hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figures 1 and 2 are plan views of my improved apparatus, the cover of the box or case being removed, showing the relative positions of the parts at the limits of the movement of the drill. Fig. 3 is a vertical sectional view on the line *x x*, Fig. 1. Fig. 4 is a sectional view, on an enlarged scale, taken in the line *y y*, Fig. 1. Fig. 5 is a sectional view similar to Fig. 3 of the front end of the apparatus, showing a modification of the drill-rotating mechanism. Figs. 6 and 7 are sectional plan views of further modifications of the drill-rotating device. Fig. 8 is a vertical section on the line *y y*, Fig. 6. Fig. 9 is a sectional plan of the mechanism shown in Fig. 5. Fig. 10 is a perspective view showing the manner of mounting the drill. Fig. 11 is an elevation of the same, and Fig. 12 is a sectional detail view of the joint between the drill and stand.

In the practice of my invention a small electric motor, 1, is secured at one end of a box or case, 2, and to one end of its power-shaft is secured a bevel-pinion, 3, which intermeshes with a corresponding pinion, 4, secured to the shaft 5, mounted in suitable bearings formed in the top and bottom of the case or box 2.

On the shaft 5 is secured a wiper-wheel, 6, whose projections or fingers 7 engage in their revolutions with the end of a lever, 8, which is pivoted on a shaft or pin, 9, passing through suitable bearings formed in the top and bottom of the case near its front end. In the forward end of the lever is arranged the tool-stock 10, so mounted as to be capable of rotation around its axis, and provided with a socket, 11, in which the drills or cutting-tools can be secured. On the drill is secured a bevel-pinion, 12, intermeshing with a corresponding pinion, 13, on the shaft 14, mounted in suitable bearings, 15, formed on one side of the lever 8. On the inner end of the shaft 14 is keyed a ratchet-wheel, 16, which is rotated during the reciprocation of the lever by engagement with a spring-finger, 17, attached to the case or box. (See Figs. 1, 2, and 3.) The rotation of the wiper-wheel causes its fingers to engage the tail of the lever 8 and shift the same to one side, thereby extending the spring 18, connected to the lever at a point beyond its fulcrum or pivot-pin 9 and to one side of the case. As the fingers of the wiper-wheel in its revolutions slip off the rear end of the lever, the latter is violently shifted in the opposite direction by the contraction of the spring, and thereby causing the drill attached to the front end of the lever to strike a hard quick blow proportionate to the power of the spring. As the lever is again shifted by the action of the wiper-wheel, the spring-finger 17 engages the ratchet-wheel 16 and partially rotates the same, and with it the drill-stock and drill.

On the top and bottom of the case, near the rear end of the lever, are formed segmental guides 19, to insure an even and regular movement of the lever, and a stop, 20, is also provided to limit the movement of the lever when operated on by the spring, said stop being faced with rubber or other suitable cushion to prevent a violent concussion from the blows of the lever. The force of the blows delivered can be regulated by employing springs of varying strength or by adjusting the spring toward or away from the fulcrum.

In lieu of the above-described mechanism for rotating the drill, a ratchet-wheel, 21, can be placed on the stock 10, with which a



spring-pawl, 22, on the sliding bar 23 engages. This bar is so attached to the lever as to move therewith, and also to move freely therealong, and is provided with a laterally-projecting  
 5 lug, 25, engaging an inclined groove, 24, formed in the bottom of the box or case, (see Figs. 5 and 9;) or the bar 23 may be connected by a link, 26, to the box or case (see Figs. 6, 7, and 8) at a point near the fulcrum of the lever. In  
 10 both of the above-described constructions the bar 24 is reciprocated back and forth by the movement of the lever while in operation.

The above-described apparatus can either be held by a workman while in operation or  
 15 can be supported by a suitable frame. Such a frame is shown in Figs. 10 and 11, and consists of a tripod, 27, provided with casters 28, to facilitate its movement in any direction desired. On the head of the tripod is secured  
 20 the socket 29, in which is arranged the ball 30, said ball being provided with a stem, 31, adapted to fit in sockets 32, formed on the lower and upper sides of the box or case. The ball and-socket joint permits of a large range  
 25 of movement of the box or case, and the sockets 32 on the box or case permit of a reversal of the machine, thereby enabling its use for undercutting along the breast of coal or other mineral from one side of the heading to the  
 30 other.

In lieu of an extension spring for operating the lever, a compression-spring may be employed, and the operating-spring may be con-

nected to the lever on either side of the fulcrum.

Although I prefer to employ an electric motor for operating the wiper-wheel, any suitable fluid-motor may be employed therefor; and in lieu of the gearing connection between the motor and wiper-wheel the latter may be  
 35 40 secured on the shaft of the motor, if desired.

I claim herein as my invention—

1. In a drilling apparatus, the combination of a lever having a drill or cutter attached to one end thereof, a spring and wiper for oper-  
 45 ating said lever, a motor for operating said wiper-wheel, and a frame carrying said devices and movable in the direction of the operative blows of the cutter or drill, thereby regulating the force of said blows and com-  
 50 pensating for the penetration of the cutter or drill, substantially as set forth.

2. In a portable drilling apparatus, the combination of a lever carrying a drill or cutter, a spring and wiper-wheel for operating said le-  
 55 ver, mechanism operated by the movements of the lever for rotating the drill, and an electric motor for rotating the wiper-wheel, substantially as set forth.

In testimony whereof I have hereunto set my  
 60 hand.

MOSES A. MICHALES.

Witnesses:

DARWIN S. WOLCOTT,  
 R. H. WHITTLESEY.